

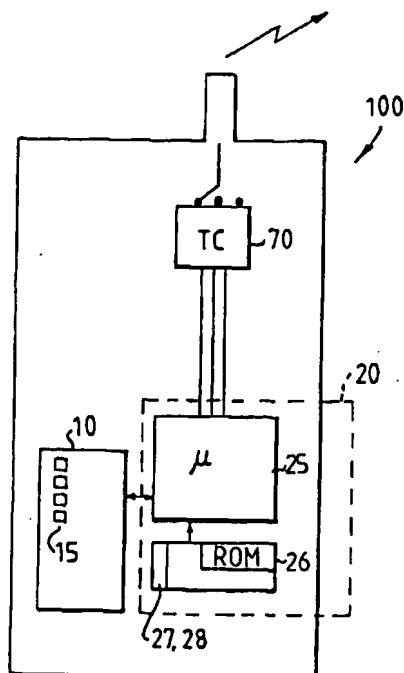


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/SE00/00962 <b>(22) International Filing Date:</b> 15 May 2000 (15.05.00) <b>(30) Priority Data:</b> 9901797-2      17 May 1999 (17.05.99)      SE <b>(71) Applicant:</b> TELEFONAKTIEBOLAGET LM ERICSSON (publ) [SE/SE]; S-126 25 Stockholm (SE). <b>(72) Inventors:</b> NILSSON, Daniel; Kungsholmsgatan 54, S-112 27 Stockholm (SE). GRANQVIST, Bo-Eric; Upplandsgatan 77, S-113 44 Stockholm (SE). DALJAVAD, Patrik; Fridhemsgatan 6, S-112 40 Stockholm (SE). EBERLE, Kai; Källparksvägen 33, S-187 67 Täby (SE). <b>(74) Agents:</b> FORSSELL, G. et al.; Albihns Patentbyrå Stockholm AB, P.O. Box 5581, S-114 85 Stockholm (SE).		<b>(81) Designated States:</b> AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** TELEPHONE BOOK NUMBER CONVERSION**(57) Abstract**

The present invention relates to a telephone book number conversion device, and related method, adapted to be arranged in a dual mode private cordless/public mobile telecommunication device (100), connectable to a telephone book (10) of the telecommunication device (100), said device (100) comprising means (20) for comparing a telephone number, chosen by a user of the telephone, to set network specific information, and determining whether to call internal or external depending on the network specific information; and means for converting said entered number if required. The invention solves the problem of providing a telephone book intended to be used in a dual mode mobile communication device, which is experienced by the user as one common telephone book, independent of access network.



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## Telephone book number conversion

### Technical field

The present invention relates to telephone books in mobile communication devices.

- 5 More particularly, the invention relates to telephone books in dual mode mobile communication devices, such as public mobile/private cordless communication device.

### Background

- 10 When using a dual mode cellular telephone, provided with a phone book, i. e. a telephone having the possibility to access both public mobile and private cordless networks, the telephone book has to be experienced as one common telephone book from the user point of view.
- 15 However, the digits to dial from the telephone to access a specific telephone number are different depending on the access environment, such as PABX (Private Branch Exchange), mobile system or cordless phones.

- When dialling from a mobile telecommunication network no telephone number conversion has to be done. However, In every other access environment, the telephone
- 20 has to be defined in the access system and number conversion is required. The number of parameters required differs from system to system, for instance in home networks, normally no PBX or external line has to be defined.

- 25 Thus, it is not possible to use the same telephone book for all types of access, i. e. mobile access as well as other types of access.

### Summary of the invention

- The present invention is directed to solving the problem of providing a telephone
- 30 book intended to be used in a dual mode private cordless/public mobile communi-

cation device, which is experienced by the user as one common telephone book, independent of access network.

Herein, a dual mode public mobile/private cordless communication device is referred to as a mobile communication device having the possibility to access both public mobile networks, as well as private cordless networks.

This problem is solved by the fact that a mobile communication network accepts a complete telephone number comprising international code, country code, area code and subscriber number. Thus, all telephone numbers stored in the telephone book are complete.

The invention is embodied in a telephone book number conversion device, adapted to be arranged in a dual mode private cordless/public mobile telecommunication device, connectable to a telephone book of the telecommunication device, said device comprising means for comparing a telephone number, chosen or entered by a user of the telephone, to set network specific information, and in cordless mode, determining whether to call internal or external depending on the network specific information; and means for converting said entered number if required.

20

According to another preferred embodiment of the invention, the number conversion unit comprises a control unit, which is controlled by a read only memory (ROM), connected to each other conventionally. The ROM comprises a recording medium and machine readable code, recorded on the recording medium, to control the control unit to execute the required program. The control unit can also be implemented as software.

25

According to another preferred embodiment of the invention, the number conversion unit is implemented as software.

30

According to another preferred embodiment of the invention, a telecommunication device is provided with a number conversion unit as described above, and comprises a telephone book, in the device or accessible from a source outside, said telecommunication device having the function to make calls without knowing anything  
5 about the system accessed for the moment.

According to another preferred embodiment of the invention, the telecommunication device is provided with or adapted to be connected to at least one telephone book for storing/transmitting telephone numbers, and comprises means for setting mode  
10 of operation, a first mode for storing telephone numbers in the telephone book, and a second mode for transmitting telephone numbers from the telephone book, means for setting network specific information, such as PBX prefix, external line, international code, country code and area code, a number conversion unit comprising means for comparing an entered number to said network specific information,  
15 whether to call internal or external depending on the entered network specific information.

Another object of the invention is to provide a computer program product having the above function.  
20

This object is solved by a computer program product comprising a computer storage medium having computer program code embodied in said medium for causing the number conversion unit to provide the above mentioned function.

25 One advantage of the present invention is that it provides that a user can have only one phone book and dial from it, independent of access net (GSM, DECT, PBX, PLMN, or mobility server).

In conventional systems, one commonly has to use two different phone books.  
30

The invention will now be described in more detail using preferred embodiments, and with reference to the appended drawings.

Brief description of the drawings

5 Fig. 1 shows a block schematic of a dual mode private cordless/public mobile phone comprising a phone book.

Fig. 2 shows a simplified process flow depicting the method of telephone book conversion.

10 Detailed description of preferred embodiments

Fig. 1 shows a block schematic of a dual mode private cordless/public mobile phone 100, comprising a number conversion device 20, according to an embodiment of the invention. The dual mode private cordless/public mobile telephone is, in the described embodiment, a dual mode GSM/DECT telephone (Digital European Cordless Telephone). The invention is not limited to such a telephone, but can be implemented in any dual mode private cordless/public mobile communication device having possibility to access public mobile networks. Of course, more than two modes is also possible, which is illustrated by three positions in the transceiver 70 in Fig. 1. Thus, herein, dual mode shall be understood as any type of multi-mode.

20

The dual mode telephone 100 is provided with a telephone book 10, which comprises memory means 15 for storing telephone numbers. A control unit 20 is connected to the telephone book. The control unit 20 is controlled by a read only memory (ROM) 25, connected to each other conventionally. The ROM 25 comprises a recording medium and machine readable code, recorded on the recording medium, to control the control unit 20 to execute the required program. The control unit 20 can be implemented as software.

30 The telephone book 10 has at least two different modes. One mode for storing information, i. e. telephone numbers as complete numbers, for instance by means of a key-board (not illustrated), said numbers comprising international code, country

code, area code and subscriber number, and one mode for transmitting telephone numbers to active network. The means for shifting the modes is not shown, since they are well known in the art. Suitably, the means for setting mode of operation is implemented as software in a conventional way well known to the person skilled in the art. Also the storing of telephone numbers will not be described in more detail, as it is well known for the person skilled in the art.

For the sake of simplicity, only the function of the conversion of the phone book is described. The function of the telephone book will not be described in more detail, as it is well known for the person skilled in the art.

The control unit 25 of the number conversion unit is for instance provided on a hardware board having one or more processors and associated memories. The number conversion unit can also be implemented in an existing control unit controlling other features, preferably as software, or hardcoded into the hardware.

In the described embodiment, the number conversion unit 20 is provided as a number of software modules written in a program language, which in the preferred embodiment is C. Of course all types of suitable languages are possible, such as C+, assembler etc. How this can be done is well known for a person skilled in the art, and will therefore not be described in more detail.

The method will now be described with reference to Fig. 2a, which describes a process flow.

It is provided that a complete telephone number, such as + 46 757 27 54 comprising international code, country code, area code and subscriber number is stored in a conventional way, for instance by means of a menu function (For instance conventional GSM-menu functions) already entered by a user.

30

If the conversion should work, the user has to enter network specific information, to define the access system. This information is unique for each DECT subscription. Under Settings Own line (Ericsson cellular phone models), the user enters the following information, procedural step 41:

5

This will be described by a telephone number such as 757 27 54.

PBX prefix The part of the number you exclude if calling internal, i. e. 75.

10 External line Code for getting external line in PBX environment, typically 00 or 0.

International code Code for dialling international prefix, typical 00 or 009.

15 Country code Country specific code, 46 for Sweden.

Area code Area code inside specified country, 08 for Stockholm.

20 Provided with this information, the telephone make a suggestion, in cordless mode, whether to call internal or external, depending on the PBX prefix.

If a telephone number comprising an internal PBX is chosen or entered, procedural step 42, and there is no match of the entered PBX prefix, procedural step 43, the telephone gives a suggestion to the user, procedural step 44, to call external (with external line code). The user can accept the suggested number by pressing the "YES key" (Ericsson models), but is of course not limited to this, since it can be implemented in an other way, depending on type of mobile device.

30 If the "No key" is pressed, by the user, the number, a complete number, is displayed as it was stored in the phone book, procedural step 45, and it is possible to call the



number as it is stored. Also the "No key" is valid for Ericsson models only, and can be implemented in any other suitable way.

However, if there is a match for the PBX prefix, the phone suggests an internal call,  
5 procedural step 46. If No is pressed again, the number is displayed as it was stored  
in the phone book, step 47.

To explain the invention in more detail, two examples will be described, with reference to Fig. 2b. One number inside the PBX +46 875 72 754 and one number outside the PBX, +46 46183000:

The settings are the following:

PBX prefix 75

	External line		00
15	International code	009	
	Country code		46
	Area code	08	

First the + is deleted, since the country code is the same, otherwise it translates the  
20 + sign into 009. 46 is deleted since it is the same country. Then the 8 is deleted  
since the number is in the home area. 75 is recognised as PBX prefix and an internal  
number is suggested, i. e. 72754. If the number had been outside the PBX, the user  
has to press No and the next suggestion would be external 00 75 72 754. If No is  
pressed again, the number is displayed as stored.

25

The second number is treated in the same way in the beginning. However, the area code is not the same as in the settings. Therefore, an external number is suggested, i.e. 00 046 183 000 (with an extra zero in the area code). If No is pressed a complete number, as stored is suggested without external code.

The invention is of course not limited to the embodiment described above and shown in the appended drawing, but can be varied within the scope of the appended claims.

### Claims

1. A telephone book number conversion device, adapted to be arranged in a dual  
5 mode private cordless/public mobile telecommunication device (100), connectable  
to a telephone book (10) of the telecommunication device (100), characterised in  
that said conversion device comprises conversion means (20) for comparing a tele-  
phone number, chosen to be called, or entered, by a user of the communication de-  
vice (100), to set network specific information, and when in cordless mode, deter-  
10 mining whether to call internal or external depending on the network specific infor-  
mation, and converting said entered number if required.
2. A device according to claim 1, characterised in that it said conversion device (20)  
comprises a control unit (25), controlled by a read only memory (ROM) (26), which  
15 comprises a recording medium (27) and machine readable code means (28), re-  
corded on the recording medium (27), to control the control unit (25) to execute the  
required program.
3. A device according to claim 2, characterised in that the control unit (25) is im-  
20 plemented as software.
4. A computer program product for use in combination with a control unit (25) pro-  
vided in a telephone book number conversion device (20) according to any one of  
the claims 1-3, said computer program product comprising:  
25 a recording medium (27);  
machine readable code means (28), recorded on said recording medium (27), to  
control the control unit (25) to carry out the steps:  
-storing telephone number(s) to be called, if not already stored;  
-setting network specific information, such as PBX prefix, external line, interna-  
30 tional code, country code, area code, if not already entered; characterised in that,

-determining, in cordless mode, whether to call internal or external depending on the set network specific information, wherein the telephone number chosen to be called is compared to the entered network specific information at call set-up.

5 5. A method for telephone book conversion in a dual mode private cordless/public mobile communication device, comprising the steps of :

-storing telephone number(s) to be called, if not already stored;

-setting network specific information, such as PBX prefix, external line, international code, country code, area code, if not already entered; characterised in that,

10 -determining whether to call internal or external depending on the entered network specific information, wherein the telephone number chosen to be called by a user is compared to the entered network specific information at call set-up in non-mobile mode.

15 6. A method according to claim 5, characterised in that the telephone number(s) to be chosen is stored in a telephone book, in the form of a mobile telephone number comprising international prefix, country code, area code, prefix and internal number.

20 7. A method according to claim 5 or 6, characterised in that an external call is suggested if there is no match between an entered external line prefix and set PBX prefix, otherwise internal call is suggested.

25 8. A method according to claim 7, characterised in that if the suggestion is ignored, the number is displayed as it was stored in the telephone book.

9. A dual mode telecommunication device (100) intended to be used in public mobile and/or private cordless networks provided with or adapted to be connected to at least one telephone book for storing/receiving telephone numbers, said device (100)  
30 comprising means for setting mode of operation, a first mode for storing telephone numbers, and a second mode for receiving telephone numbers, means for setting

network specific information, such as PBX prefix, external line, international code, country code and area code, means (20) for comparing a number chosen to be called, to said network specific information, whether to call internal or external depending on the entered network specific information; and converting said number if  
5 required.

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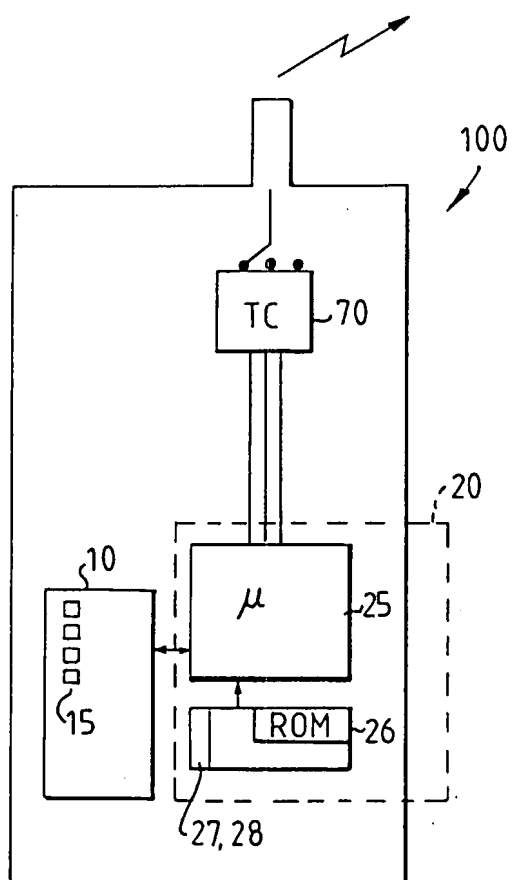
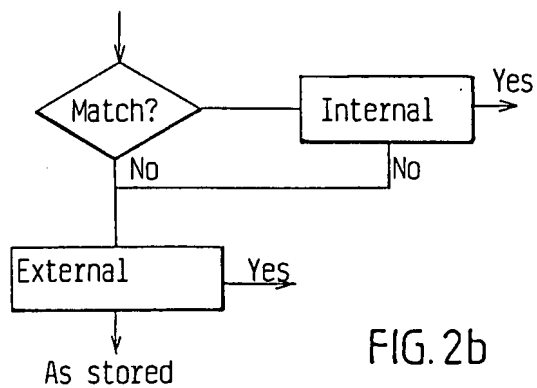
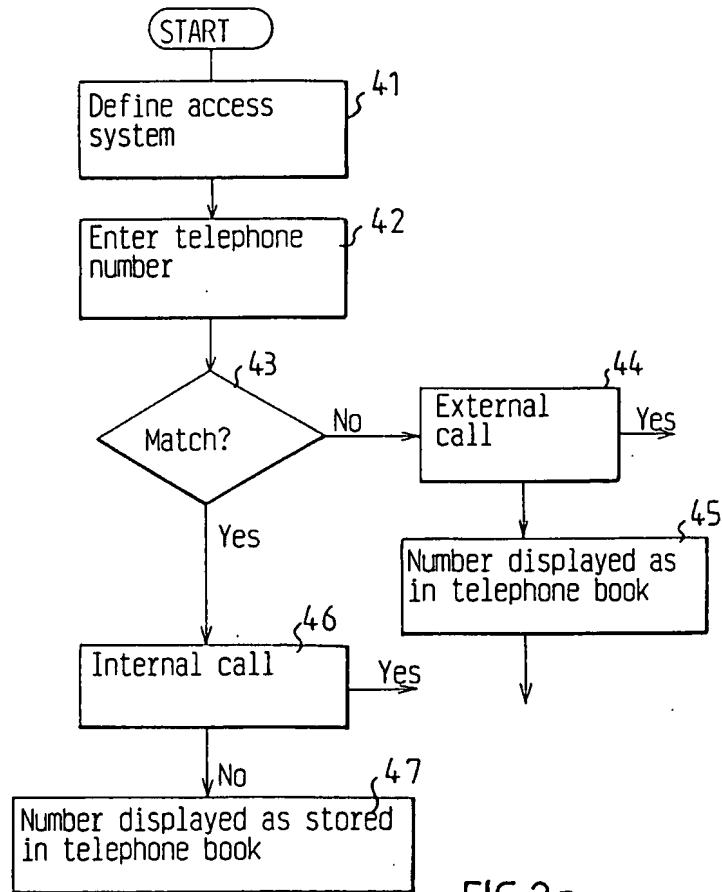


FIG.1

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/00962

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04M 1/274, H04Q 7/32

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04B, H04M, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0858204 A2 (NOKIA MOBILE PHONES LTD), 12 August 1998 (12.08.98), page 1, line 3 - page 5, line 46, figures 1-4, claims 1-14, abstract  --	1-9
X	DE 4343335 A1 (TADICOM EUROPE GMBH), 22 June 1995 (22.06.95), column 1, line 3 - column 5, line 48, figures 1-2, claims 1-9, abstract  -- -----	1-9

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report			Publication date	Patent family member(s)	Publication date
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